



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/082,705	02/25/2002	Ulrich Noth	NOT01-NP002	5327

7590

05/31/2005

David S. Resnick  
NIXON PEABODY LLP  
100 Summer Street  
Boston, MA 02110

EXAMINER

MARVICH, MARIA

ART UNIT

PAPER NUMBER

1636

DATE MAILED: 05/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/082,705

Applicant(s)

NOTH ET AL

Examiner

Maria B. Marvich, PhD

Art Unit

1636

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 02 March 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10, 12-14, 17, 21 and 22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-10, 12-14 and 17 is/are rejected.
- 7) ☒ Claim(s) 6, 21 and 22 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

Art Unit: 1636

### **DETAILED ACTION**

This office action is in reply to a response to an amendment filed 3/2/05. Claims 11, 15, 16, 18-20 and 23-25 have been cancelled. Claims 1-4, 6-10, 12, 13, 17, 21 and 22 have been amended. Claims 1-10, 12-14, 17, 21 and 22 are pending in this application.

#### ***Response to Amendment***

Any rejection of record in the previous action not addressed in this office action is withdrawn. There are no new grounds of rejection herein and, therefore, this action is final.

#### ***Claim Objections***

Claim 13 is objected to under 37 CFR 1.75 as being a duplicate of claim 10. The two claims are duplicates therefore; it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k). **This is a new objection necessitated by applicants' amendment.**

Claim 14 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 13 already recites that the osteoinductive growth factor is BMP-2 which limitation is set forth in claim 14. **This is a new objection necessitated by applicants' amendment.**

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4 and 7-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Valentini and Kim (US 5,939,323; see entire document). **This rejection is maintained for reasons of record in the office action mailed 5/6/04 and restated below.**

Valentini and Kim teach the development of scaffolds that are useful for a variety of medical purposes (see e.g. abstract). As regards claims 1, 8 and 9, scaffold serves as a substrate for cells such as mesenchymal stem cells from bone marrow and periosteum and endosteum (see e.g. column 7, line 35-42) for methods for repairing cartilage (see e.g. col 3, line 63-67). The scaffolds are contacted with cells for tissue culture (see e.g. col 3, line 56-59). As the technique of press-coating is not defined or described in the specification of the instant invention, it is unclear that *contacting the surface of the scaffold with the cells* does not entail press-coating. As regards claims 2-4, the scaffold is comprised of porous biodegradable polymers such as polylactic (see e.g. column 1, line 64 through column 2, line 10 and column 6, line 40-47). As regards claim 7, the scaffold is not limited to any particular shape but is designed to meet the needs of the medical procedure for example to repair cartilage defects (see e.g. column 7, line 46-48). As regards claims 10, 12-14 the scaffolds also incorporate BMP-2 (see e.g. column 13, line 5-14). Cells were seeded on the scaffold for 30 minutes (first time period) and then grown for 11 weeks (second time period).

*Response to Argument*

Applicants traverse the claim rejections under 35 U.S.C. 102(b) and by extension 103(a) on pages 11-13 of the amendment filed 3/2/05. Applicants argue the following. The instant invention distinguishes itself by the unique aspect of the present grafts and methods of making such grafts is that the cells are first pressed on the scaffold and then cultured before implantation to allow formation of a cartilage layer. Applicants point to passages of the specification intended to teach these unique aspects. For example, page 12 and 16 teach that the polymer blocks are gently pressed or placed onto the cell pellets. Furthermore, applicants argue that Valentini does not teach that the graft contains a cartilage layer nor that the cells are press-coated.

Applicants' arguments filed 3/2/05 have been fully considered but they are not persuasive. Applicants have argued that press-coating the cells to the polymer block distinguishes the instant invention from the art. This is accompanied by a description of press-coating the entails pressing or placing the cells on the block. Ultimately, the cells are pressed to the surface. Similarly, Valentini et al teach seeding or contacting the surface with the cells. Seeding comprises pressing cells onto a surface and hence the cells of Valentini et al are pressed such that the surface is coated. The invention of Valentini et al is explicitly designed for the repair of cartilage defects with cartilage cell precursors such as those described for bone. These cells include mesenchymal cells (see col 7, line 40-52). Furthermore, it was well known in the art that mesenchymal cells are precursors for cartilage thus functioning in cartilage repair. Johnstone and Yoo review the art of articular cartilage repair. According to Johnstone and Yoo, mesenchymal cells have been studied in cartilage regeneration because of their known chondrogenic capabilities and the fact that they can be harvested easily (see e.g. page 919,

Art Unit: 1636

paragraph 1). These cells have been demonstrated to produce hyaline-like cartilage *in vitro* and *in vitro* tissue engineered cartilage using mesenchymal stem cells. The art reviewed by Johnstone and Yoo indicate that at the time of filing, a person of skill in the art would have recognized that inclusion of mesenchymal stem cells in *in vitro* tissue engineered structures was for the express purpose of generating cartilage (see e.g. page 919, col 1, paragraph 4). Therefore, it is no surprise that the mesenchymal stem cells of Valentini et al are used for the express purpose of differentiating into cartilage for cartilage repair.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Valentini and Kim (US 5,939,323; see entire document) in view of Brekke and Toth (J Biomed Mater Res 43:380-398, 1998; see entire document) and Hung and Lo (US 2002/0045260; see entire document). **This rejection is maintained for reasons of record in the office action mailed 5/6/04 and restated below.**

Applicants claim engineered osteochondral graft made of D,D-L,L-poly(lactic acid) and a method of making the graft in which a high-density pellet of MSC are grown for a first and second time in chondrogenic differentiation medium.

The teachings of Valentini and Kim are described above and are applied as before except:

Art Unit: 1636

Valentini and Kim do not teach use of D,D-L,L-polylactic acid in the matrix or a method of making the graft in which a high-density pellet of MSC are grown for a first and second time in chondrogenic differentiation medium.

Brekke and Toth teach devices for tissue engineering which are comprised of D,D-L,L-polylactic acid.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute polylactic acid taught by Valentini and Kim with the D,D-L,L-polylactic acid taught by Brekke and Toth because Valentini and Kim teach that it is within the ordinary skill of the art to make a scaffold comprised of biodegradable polymers and because Brekke and Toth teach that it is within the ordinary skill of the art to use D,D-L,L-polylactic acid in tissue engineering. One would have been motivated to do so in order to receive the expected benefit of a scaffold that can be molded into three- dimensional architecture to deliver compounds such as cells or BMP2 to subjects and that satisfy performance criteria (see Brekke and Toth, page 393, paragraph 2 and page 390, paragraph 3 and 4). Based upon the teachings of the cited references, the high skill of one of ordinary skill in the art, and absent evidence to the contrary, there would have been a reasonable expectation of success to result in the claimed invention.

### ***Conclusion***

Claims 6, 21 and 22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 1-5, 7-10, 12-14 and 17 are rejected.

Art Unit: 1636

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria B. Marvich, PhD whose telephone number is (571)-272-0774. The examiner can normally be reached on M-F (6:30-3:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Remy Yucel, PhD can be reached on (571)-272-0781. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Maria B Marvich, PhD  
Examiner  
Art Unit 1636

May 18, 2005



JAMES KETTER  
PRIMARY EXAMINER